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SOIL CONSERVATION

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UNITED STATES DEPARTMENT OF AGRICULTURE - WASHINGTON

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WELLINGTON BRINK
EDITOR

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SOIL CONSERVATION

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SECOND INTER-AMERICAN CONFERENCE ON AGRICULTURE

BY EDWARD H. GRAHAM¹

Called by the Mexican Government's Secretary of Agriculture, Marte R. Gomez, the Second Inter-American Conference on Agriculture held at Mexico City July 6-16 was attended by representatives of all the American countries of both continents. In the words of the Secretary, the purpose of the conference was "to formulate the basis of a continental cooperative plan for the development of agriculture and to establish a closer connection between the official and private organizations that have charge of this important branch of production." Dedicated to the facilitation of American agricultural production and distribution in order to aid the United Nation's war effort and produce the necessary food and fibre for the peace that follows, the conference was opened by President Avila Camacho at Chapultepec Castle, traditional home of Maximilian and the Empress Carlotta during Mexico's uncertain rule by France. A great many appropriate subjects were freely discussed and 76 resolutions contributing to the purpose of the conference were adopted. So comprehensive were the agenda that the work of the delegates was apportioned to 13 committees, meeting separately except at plenary sessions.

The American delegation was headed by United States Secretary of Agriculture, Claude R. Wickard, and was composed of a large retinue of specialists from the United States Department of Agriculture and agricultural colleges as well as from other institutions and governmental bureaus. The brisk, cool climate of the Mexican plateau, on which Mexico City is situated at an altitude of 7,434 feet, offered a stimulating environment for the deliberations of the delegates, and the city itself, a thriving, modern metropolis of 2,000,000 persons, provided a most delightful setting for the extremely hospitable welcome extended by the Mexican Government and people.

Among the resolutions adopted, food and crop production received primary attention, its importance emphasized by the war needs of the United Nations. Correspondents were named to study food distribution and eliminate artificial restrictions that might impede it, develop cooperative methods for equitable distribution, and adopt measures to reduce

surpluses. Increased production of essential food crops, and national and international subsidies to accomplish this end, were also recommended. It was suggested that American nations take steps to facilitate the exchange of fruit and to stimulate private interest in the storage and refrigeration of foods. The study and production of dehydrated foods were emphasized, and it was resolved that existing institutions and new laboratories accentuate research upon new uses for surplus crops.

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Equitable agricultural production in each country was sought through international cooperation and the American governments agreed to adopt measures to discourage unfair competition, especially as it results from the war effort. Plans were suggested for increasing the production of vegetable oils and American countries were urged to introduce and cultivate plants producing tea, spices, tannins, insecticides, drugs, fats, oils, and resins. Surveys were also recommended to determine American supplies of these and other agricultural resources, such as rubber, woods, fibres, cellulose, waxes, gums, and medicinal plants. Lifting of restrictions on production and use of *yerba mate* was sought and a study was directed toward the elimination of restrictions on the importation of vegetables. The conservation of meat was encouraged through use of private capital under Government direction.

It was resolved that, where the climate is suitable, American countries will introduce tung and experiment with its production; the delegates also agreed that the Pan American Union and interested governments would do well to establish a Cacao Institute in Ecuador and other cocoa-producing countries, to exchange techniques, compile and publish results. The conference recommended the adoption of methods of conserving rubber, as well as the establishment of plantations, and encouraged use of agricultural products in the manufacture of synthetic rubber. Sugar and starchy products, as corn and wheat, not otherwise used as food or in the chemical industries, are to be converted to alcohol for the production of synthetic rubber and motor fuels. Forestry surveys, training, and research were recommended, together with the establishment of a forestry section in the Inter-American Institute of Agricultural Sciences.

It is of significance that the people as well as the products of the land received thoughtful discussion, the improvement of rural conditions being treated in no less than 10 resolutions. At study of American rural living conditions was recommended, with improvement of education and sanitary conditions stressed, and the Pan American Union was asked to consider the founding of a section to study distribution and colonization of rural peoples. Native farm customs and traditions are to be studied with a view to preserving customs that are useful and eliminating those that are detrimental. It was suggested that typical rural developments—cooperatives—be established to demonstrate economic and social organization, and that experiment stations and agricultural schools study the most useful plans and materials for rural homes and teach farmers how to

RESOLUTION NO. 30

Soil Conservation and Technology

(Translated from the Spanish)

WHEREAS:

Much land in America has been seriously damaged or ruined by erosion, and at a rapid rate, through lack of adequate conservation,

IT IS RECOMMENDED:

I. That great attention be directed toward maintaining and increasing the productivity of the soil by means of erosion prevention and control measures, the conservation of moisture, and the use of adequate farm practices.

II. That there be established among the American nations, means for training and equipping specialists to develop practical work programs for maintaining and improving the productivity of the soil through these same methods of erosion prevention and control, through improved farm practices, and by interchange of ideas, data, students, technicians, and other means.

III. That the localization, extension, and conditions of areas affected or menaced by erosion be determined by joint reconnaissance that will point out methods and procedures satisfactory for the development of programs that will make possible the adoption of standard practices for erosion prevention and control.

IV. That in regions representative of the various types of erosion problems there be established practical demonstrations of the best-known methods for soil conservation in relation to erosion prevention and control, the conservation of rainfall, and the development of new lands through drainage or other appropriate measures.

V. That an increase in agricultural production be planned, taking into consideration the fact that the improvement of soil productivity through adequate methods of procedure is generally more economical and practical than the opening of new lands for cultivation without employing satisfactory methods of production.

VI. That institutions dedicated to the conservation of soil fertility or to its improvement be organized in the various Latin-American nations.

VII. That the governments of America disseminate the practical knowledge of soil conservation by means of films and that these be placed at the disposal of said governments to be exhibited in whatever manner is most convenient.

use them. The teaching of home economics is to be included in agricultural education, and a study of foods, food habits, and cooking was recommended in order to develop rural dietetic programs.

The biological aspects of agriculture demanded considerable attention. International methods of pest control were recommended as were studies of insects affecting man and animals. Entomologists agreed to exchange results of investigations on the

biology of insects, insect relations to plants, and other entomological information; also to establish procedures for an inter-American plant quarantine. Studies are to be made of insecticides and fungicides, especially of little known plants that are sources of these materials, and standards are to be set up for classifying biological agents that transmit human and animal diseases. The Peruvian Government was commended for wildlife management resulting in a 400-percent increase of its guano birds, and a section in the Inter-American Institute of Agricultural Sciences was suggested for the protection of wild plant and animal life. It was recommended that land management programs consider the biological aspects of their operations on all agricultural lands.

Several recommendations referred to the soil—its study and conservation. One dealt with exchange of information about the physical characteristics of soil, another with chemical characteristics and teaching farmers the care of soil fertility. A permanent committee was set up to establish an Inter-American Society of Soil Science patterned after the International Society of Soil Science, and a uniform system of soil examination and classification is to be adopted, patterned after that of the United States Department of Agriculture and the terminology appearing in the Glossary of United States Department of Agriculture Yearbook, "Soils and Men," which has been translated into Spanish by one of the Argentine delegates. Of prime interest to soil conservationists was resolution No. 30, providing that soil conservation programs be developed in all the American countries, based on erosion reconnaissance and conducted by demonstration method, and that increased agricultural production be planned through the use of soil conservation practices.

The committee on animal industry heard many worth-while discussions, and as a result the conference recommended the control and inspection of all cattle imported for breeding purposes, with the establishment of livestock experiment stations to aid stock raisers. All countries are to hold periodic livestock shows for educational purposes, and they agreed to develop a single standardized cattle register, undertake systematic cattle-tick work, distribute Bangs' disease vaccine, encourage artificial insemination of cattle, and make a cattle census.

The role of transportation was not neglected, and it was suggested that land routes of transportation be improved, especially portions of the Pan American Highway, and that a permanent commission be established in the Pan American Union to facilitate maritime transport. A committee was appointed to

found an Inter-American Bank of Agricultural Credit and a resolution was directed at the establishment of agricultural credit for small farmers, with attention to technical and educational aspects. The conference recommended that each American government, with appropriate technical and financial background, help to organize agricultural producers, especially small farmers in cooperative groups, and protect agricultural workers according to international working agreements. Insurance for agricultural crops and farm animals was urged, and increased use of agricultural machinery, especially by cooperatives, was recommended.

Further resolutions dealt with an inter-American system of agricultural cost accounting and statistics, climatic studies, rural electrification, irrigation and drainage, plant introduction and exchange, importance of social sciences to agriculture, placement of agricultural attachés with the diplomatic representations of all American countries, encouragement of immigration, and agronomic attention to Indian affairs. The delegates believed it desirable that the Pan American Union, in collaboration with the Inter-American Institute of Agricultural Sciences, coordinate all agricultural cooperation and extension, and arrange the exchange of students and experts.

In order that the recommendations of the conference be more than idle promises and take concrete form, it was severally resolved that the papers presented be published, that the American governments keep the Pan-American Union informed of progress in carrying out the resolutions, and that a place be set for another meeting within the next 2 years. Furthermore, the final act of the conference was the appointment of a committee, headquartered in Mexico City and composed of the chiefs of delegates from Argentina, Chile, Colombia, Cuba, Honduras, Mexico, and the United States, to secure the fulfillment of the recommendations of the conference.

The depth and far-reaching significance of what we had so freely discussed, considered and recommended, was solemnly emphasized at the closing session of the conference when President Avila Camacho, in his quiet, firm voice, concluded an instructive and poignant address with the words: "Land and liberty have been invariably, in our hemisphere, united and parallel concepts. Without land, liberty becomes a mere legal notion, lacking reality. Without liberty, the land is barren, for however gigantic the material resources accumulated by the technique of oppression may be, the best fertilizer for the furrow will always and everywhere be the faith of the tiller of the soil in the redeeming quality of his task."

SOIL PUT TO CLINICAL TESTS AT TAR HOLLOW CONFERENCE

BY WELLINGTON BRINK, EDITOR

At Ohio's newly famed Conservation Laboratory the land is the textbook. Soil, water, wildlife, rocks, plant growth, microorganisms—all the pull and play of natural forces—are the working materials.

Countless thrills for the sedulous student unfold along a 3-mile Nature Trail. Writ on the wooded slopes is sober wisdom that man must have if he would dwell amiably in his earthly environment.

Yes, the land is the textbook. And the Universal Mother is the preceptress. There are other teachers, too. They are leather-booted geologists, khaki-clad botanists, ornithologists, and soils scientists, who direct the seeing and help shape the deductions.

Pupils, in other seasons, are teachers themselves. From grade schools and high schools they come; from city and town and rural community. In the fall they return to their classrooms imbued with new appreciation of life's homilies, strengthened in love and understanding of the land and its progeny. They are a tanned and enlightened and well-summered group, expertly tutored in the dramatic story of how to check the rampant raindrop, how to build production by conservation measures. They carry to youth crisply fresh ideas of the interrelationships, the cooperation, the ecology that must prevail for efficient outdoor housekeeping.

On the great stone porch of the headquarters building of the Tar Hollow Camp is an interesting collection which steadily grows with the days and weeks of the laboratory period. There are snakes and bats, ferns and frogs, fish and flowers—the live or mounted trophies of a healthy inquisitiveness. There are soil samples and rock fragments, spiders and snails, zoophyte and animalcule—a fair sampler from the flora and fauna of the 16,000-acre college that is Ross-Hocking State Forest, not far from Chillicothe. The museum evidences the laboratory's chief point of emphasis, which gives to field investigations equality with lectures and notebooks.

Experience shows that this is a good way to propagate both soil conservation and human conservation. Ohio State University allows undergraduate and graduate credits for courses and joins the State Department of Education in giving support to the school. The archetype and direction belong to the Division of Conservation and Natural Resources of the Ohio Department of Agriculture. Ollie E. Fink is in command.

High spot of the 6-weeks laboratory was a 2-day conference (June 27-28) on conservation, nutrition, and human health. This conference, similar to the one of last year, was arranged by Dr. Jonathan Forman,¹ editor of the Ohio State Medical Journal and specialist in nutritional diseases. Even without extensive promotional effort, the soil-nutrition conference overnight more than quadrupled the laboratory's normal attendance.

Speakers included Dr. Wilbur Stout, State geologist; Dr. W. A. Albrecht, chairman of

¹ See Dr. Forman's article, "Conservation, Nutrition, and Human Health," in this issue.

Missouri University's Department of Soils; Dr. Kenneth C. Beeson, Nutrition Laboratory, United States Department of Agriculture; Dr. Paul B. Sears, Oberlin College, author of "Deserts on the March"; Dr. Clarence Mills, professor of experimental medicine, University of Cincinnati; Dr. D. R. Dodd, agronomist, Ohio State University; Dr. C. Langdon White, Department of Geography, Western Reserve University; Mr. Fink, and Dr. Forman.

Addresses were premised on the truism that bodies—plant and animal—are "built from the ground up." With this was coupled consideration of the role open to comprehensive soil conservation in creating healthy individuals, plants, and animals, that society may enjoy the fruits of victory in war and also in peace. A lettuce leaf is a lettuce leaf to the average housewife, but to a scientist a lettuce leaf can be either "merely a lettuce leaf" or else it can be a repository rich in vitamins and needed minerals, depending entirely upon the soil from which it grew. There is an expanding group of physicians, dieticians, and soil chemists who are beginning to draw important distinctions of this sort.

From time to time physicians, dentists, veterinarians, food specialists, and others have noted curious phenomena which seemed to relate geography to biological peculiarities. Horses raised on Kentucky bluegrass raced faster, lived longer. Kansas City packing houses dispensed a superior quality of sirloin steaks.

For a long time, lay opinion was wont to accept such matters as happenstance or to invoke general explanations which did not entirely convince. More recently, however, science has begun to delve deep. At last year's meeting of the American Dental Association in Houston, for example, Dr. Edward Taylor called attention to the tooth-decayless paradise that is Deaf Smith County, Tex. Dr. Taylor found that the soils of this county are unusually rich in fluorine, phosphorus, calcium, and vitamin D—which presumably accounts for the almost total absence of cavities, toothaches, fillings and bridgework in that county. Wheat ground in the local mills is high in protein, contains about 6 times the normal quota of phosphorus. Milk has 30 times the phosphorus ordinarily expected. Vegetables, dairy and meat products are exceptionally high in the elements required to build and maintain tooth tissues. Well water is especially abundant in calcium.

The Tar Hollow conference dug far into soil and nutritional relationships such as these. Lecturer after lecturer affirmed the importance to the national health of maintaining the nutrient content and quality of the soil by conservation and replacement measures. Good farming—conservation farming—was stressed again and again because of the dire consequences to health of what one speaker termed the "under-development of the soil."

Added to the intimacy of soil and nutritional affinities against a background of good or bad farming are close relationships of water conservation, soil conservation and health conservation put in bold relief by Dr. Stout. "What's happened to our water?" asked the State geologist. With maps, charts, simple arithmetic, and Euclidean logic, Dr. Stout demonstrated Ohio's problem and carried through to an answer. He produced evidence that Ohio's water table has receded 19½ feet in 20 years. The sweet water—potable water—table is today limited in the State to a very thin upper crust. With a usual 37.97-inch rainfall, a third is lost in runoff. Flood hazards result, farm supplies of water are vastly restricted, industrial needs are endangered, sanitation lacks constitute a menace. "Some of these days we're going to have to talk recharge," declared this authority, "and the time is not far off. If we can save three one-hundredths of the runoff we can take care of all human needs in Ohio; if we can save three-elevenths, we can take care of our industrial requirements. Most important in effecting a recharge is the farmer, who can do it by soil conservation—contour

plowing, strip cropping, cover crops, farm forestry, all the techniques known to hold the water by simple mechanics, and to improve the humus content and the tilth."

Dr. Mills made clear that the energy to control our environment is essentially a product of that environment, supporting the belief of the ecologist that man is not a detached manipulator, free to do what he will with the world in which he finds himself. He is part of the landscape to which he belongs, obligated to a responsibility for the conditions which determine our behavior and that of our fellows.

Charged with summarization, Dr. Sears made this neat observation: "An essential point that has been brought out in the past 2 days is this: there is no possibility of solving any particular problem of conservation by itself. Rightly, the soil was the center of our discussion, and its relation to health a starting point. But every speaker exemplified the fact that all of the problems are woven into a seamless structure. You cannot solve one without the other."

Closing session was in charge of The Friends of the Land,² a nonprofit, nongovernmental organization which is doing splendid work in helping to shape policy and action in the use of land and water. Dr. Charles Holzer, president of the association, presided at a round-table discussion of how to further through the schools the social necessities of soil conservation. Featured speaker was Dr. John D. Detwiler, president of the Canadian Conservation Association. Dr. Detwiler was flanked by Bryce Browning, secretary of The Friends; and the three editors present—Russell Lord, of *The Land*; Dr. Forman, of the *Ohio State Medical Journal*; and Wellington Brink, of *Soil Conservation*.

Following the round-table, lights were dimmed for a showing of a new Department of Agriculture motion picture "The Land," enjoyment of which was enhanced by a brief discussion of the film and Robert Flaherty, its maker, by Russell Lord, who wrote the original script.

² See Russell Lord's article, "A Report on a Friendly Meeting in Missouri," in this issue.

CONSERVATION, NUTRITION, AND HUMAN HEALTH

BY JONATHAN FORMAN, B. A., M. D.¹

All of our foodstuffs, both in their primary nutrient qualities and in their mineral and vitamin content, are profoundly influenced by the soil in which they grow. The plant products we eat and the plant products the animals eat and which in their meat passes on to us have their "hidden" food values largely determined by the land, good or bad, where they grow.

Conservation means many things to many people. It is such a comprehensive thing. Conservation is concerned with flood control, soil erosion and depletion, farming, wildlife and game, the health of man and his animals as well as the peace, prosperity, and happiness of the people. The trapping of the raindrops and the control of floods belong to the soil conservationist. The nutrient qualities of the soil belong to the soil technologist. The behavior of plants upon that soil belongs to the plant physiologist and pathologist. Then the health of the animals which provide us with food belongs to the experts on animal nutrition and dairying. Although wildlife and game come and go with the fertility of the soil their

¹ Editor, the *Ohio State Medical Journal*; lecturer on medicine (allergy) in the Ohio State University; director-general, International Correspondence Club of Allergy.

problems have special students. The methods of gathering, preserving, cooking, preparing, and serving these foodstuffs belong to the home economist. The study of the needs of the normal human being belongs to the nutritionist. Finally, the recognition of the signs of bad nutrition and the ill health which comes from eating poor foods is a function of the physician. Each of these experts has a fund of knowledge which the others need in working toward an improvement in human nutrition and welfare. It is the human need that always gives value to our endeavors.

Certain facts stand out in any review of nutrition in this country.

First: The value of adequate, balanced foodstuffs in childhood has been demonstrated on a mass basis. Army statistics indicate that today's young men—having been given the benefit of even the meager knowledge available in their childhood of the importance of vitamins in nutrition—are taller, heavier, and in far better general health, on the average, than were their counterparts in the last war—only one generation ago. Our discussion here has to do with improving upon the best. Let us not forget in our desire to reform that our people are the healthiest and richest people who have ever lived on this earth.

The second fact that stands out is this: Marked improvement in health and physical condition of American youth is not enough! All authorities agree that the average American diet is not adequate in the "protective foods" which the children of today need to become more vigorous citizens of tomorrow. This is not a matter of income, for nutritional deficiencies are as common among the so-called "well-to-do" as among the less fortunate. In the more critical growing days of the pre-school child, such deficiencies exist without the parents' knowledge and may provoke serious consequences. In the second year of life nutritional deficiencies still rank as the chief cause of diseases.

Third: Today's resources for assuring optimum nutrition are adequate, convenient, and inexpensive. At no previous time in the world's history have circumstances been so propitious for the convenient, economical provision of an adequate and balanced diet. We have the resources, we have the knowledge. We only need to put to use what we know to insure our children escape from the nutritional dangers of their second year; to insure good sound teeth, thus wiping out the dangers of focal infection and carrying the life expectancy of our people well past the seventieth year.

Medical research made a great contribution to human welfare when it began to dig up positive evidence that improper food and a consequent bad nutrition was the underlying cause of many diseases. Not only organic diseases were so identified but bad nutrition was found to interfere with the proper working of the bodies of both animals and human beings. The illnesses produced by deficient foodstuffs were found to be for the most part chronic and crippling in character, creating in themselves scores of social problems. Chronic illnesses due to bad nutrition are the largest single factor in the problem of the aged. In fact, if we cannot give our old people a continued active, productive life

such as we now have the knowledge to do they threaten to overwhelm our social structure.

We now know for sure that certain definite diseases are due to certain specific deficiencies in our diet. We are also beginning to appreciate that there are literally millions of people and animals who are suffering from a lack of proper food and who do not exhibit positive disease. They enjoy poor health. They have such a loss of natural vitality that they have little or no vigor. They just are not well. They have an increased susceptibility to all sorts of infections and degenerative diseases. How to restore these chronically half-sick persons to robust health by getting them into a state of optimum nu-



The way of Nature is the way of conservation. Health of man depends on health of land. On a bridge along the Nature Trail, David Herrman of Soil Conservation Service, Dr. Forman, and Frank Crow of Forest Service plan a concerted attack.

trition has been and is our fundamental social problem.

We already know enough about improving our daily menus so that *each of us on the average could add seven useful, active years to our lives if we would but put into practice what is known.* We know also that nutrition has a great deal to do with the general physical, mental, and spiritual well-being of all of us. Richard Osborne Cummings aptly summarized all this when he wrote: "The science of nutrition may be said to have advanced to the point where it is firmly established, not only as a branch of presenting medicine, but as a *major instrument of social policy.*"

The starting point for the solution of our problem of how to get a strong, healthy, and happy people living in an effective social order is in the soil. While much remains to be learned, we do have a great deal of evidence that the lack of physical and mental vigor of our people is related to the deficiencies in the soil and in the foods produced from such soil. There are areas in the world where human or animal foods, or both, are inadequate because the soils there lack lime, phosphorus, sulphur, iodine, copper, iron, cobalt or minute traces of other essential minerals in forms which are available to its plants.



Man's estate being cheerfully inventoried by members of the Fourth Estate. Represented, left to right, *Soil Conservation, The Land, The Ohio Medical Journal*, by editors Brink, Lord, Forman.

Evidence begins to accumulate that much damage has been done to the social and physical health of our people through the depletion of our soils. In recent years some have been greatly concerned with what they call adequate medical care for the underprivileged. This is a generous gesture, but it makes little difference to society in the long run who gives what colored pill to whom. Pills and potions relieve suffering and at times conquer infection. Proper nutrition through eating of foods rich in nutrients would have prevented this sickness in the first place.

Let me illustrate what I mean by the studies which have been made upon the Cincinnati Negro in the slum areas where food supply, food preservation and food habits are all bad. They die like flies from rheumatic fever, tuberculosis, and other diseases brought on by lowered resistance. In a Negro suburban village under average suburban standards of living the relatives of these same Negroes die at the same rate and with the same diseases, as do the white people of the neighboring towns. No one is particularly interested in the health problems of an individual colored citizen in these slums, but once his malnutrition has lowered his resistance and he develops tuberculosis, he is taken to a magnificent institution with marble halls. Doctors and nurses are provided in abundance to study his case and serve him. Too often it is too late. The farm crops we didn't raise and the milk we didn't produce would have prevented him from ever having been infected with tuberculosis.

Or again, some 10 years ago the Dental Society of Pennsylvania offered to fill free of charge the cavities in the teeth of all the children whose parents were on relief. This, too, was a noble gesture on



Top row, left to right—

Jonathan Forman, M. D., editor, *Ohio State Medical Journal*; Russell Lord, editor of *The Land*; Charles Holzer, M. D., president, Friends of the Land; Walter Frye, Wooster, Ohio, prominent in the work of the Izaak Walton League.

Middle row, left to right—

Arthur Harper, field naturalist; Ollie E. Fink, director of Conservation Laboratory; Dr. C. Langdon White, Department of Geography, Western Reserve University; Bryce Browning, executive secretary, Friends of the Land.

Bottom row, left to right—

Dr. Kenneth C. Beeson, Nutrition Laboratory, U. S. Department of Agriculture; Dr. Paul B. Sears, chairman, State Conservation Education Committee; Dr. D. R. Dodd, agronomist, Ohio State University; Frank Crow, supervisor, U. S. Forest Service, Columbus, Ohio; Dr. John Detwiler, president, Canadian Conservation Association, London, Ontario; Wellington Brink, editor, *Soil Conservation*.

the part of the dental profession of Pennsylvania and cost these dentists an immense amount in time, energy, and money and material, but the cavities continued to develop faster than the dentists could fill them because the children weren't getting the foods rich in calcium and vitamin D. It is, therefore, to be hoped that our attention will not become fixed on some scheme for getting sick people to physicians but rather that we shall realize that they are sick and always will be sick with one disease or another as long as they live if they are not given proper nourishment. Prevention is the thing that is needed in meeting this problem.

In this connection I always like to cite the experi-



Organizational brothers-in-arms figuratively help to cross the bridge from exploitation to conservation. Two friends of two neighbor Nations talk over the problems posed at Tar Hollow. Left is Dr. Charles Holzer, president of Friends of the Land; right, Dr. John Detwiler, president of Canadian Conservation Association.

ence of the people of my own city. Some 40 years ago, hundreds of people were stricken with typhoid fever every summer. The physicians of the city literally lived off typhoid fever. The citizens determined to do something about it. Mass meetings were held. Opinion was sharply divided. Physicians were on both sides. Now, if the majority had been thinking as we have been in the last 15 years, they would have hired 200 doctors, 100 nurses, subsidized all the hospitals, and given the people of Columbus adequate medical care and a whale of an annual tax bill. Fortunately, more practical minds prevailed in those days and the city of Columbus obtained a pure water supply. Typhoid fever promptly disappeared. Now the adequate care of typhoid fever in our town costs no one anything.

If we restore the fertility to our soil, grow nutritious fruits, plants and vegetables on this recharged soil, and get our people to preserve and prepare them properly so that all may have a well-balanced diet, those diseases which give rise to this problem of adequate medical care will pretty much disappear.

It's to be hoped that we are at the beginning of an epoch when it becomes the duty of society, as a matter of public health and welfare, to see to it that all its members get a diet which squares with the scientific standards of "an optimum diet." To me this means not doling out foodstuffs and vitamin pills. It means seeing to it that American foods are made rich in the essential elements of nutrition so that all can get them and be sure that they are in the foods they do buy. Finally, there must be a change in the sense of values which many of our people have. We must increase our natural production of foodstuffs by at least 35 percent, for we never have raised more than two-thirds enough to meet the minimum dietary requirements. It's true that nearly two-thirds of our people are more or less lacking in proper foods, either through ignorance or poverty, but when three-fourths of the automobiles in America are driven by people earning less than \$20 per week I am convinced that our immediate problem is the development of a proper sense of values.

The immediate decision for most of our people is to choose between a car, movies, store teeth, unpaid doctor bills, and good food with its attendant good health.

We are all agreed that education is necessary if we are to make good citizens out of our children, but our children cannot get what they should from their teachers if they are hungry. I refer here not so much to apparent hunger as to the so-called "hidden hunger."

Deficiency in vital food elements is widespread among our school children. This has been brought about by our insistence upon overrefining our foodstuffs, and *the depletion of our soils of their essential minerals through bad farming practices*. It has never seemed sensible to me to spend large sums of money on teachers, buildings, and school books, and at the same time neglect the health and nutrition of our pupils. It is a well-established fact that undernourished children lack the mental alertness necessary for learning.

We must, therefore, pay much more attention than we have in the past to this matter of eating for health. I have, and I hope I can give to you, a viewpoint on this matter of health which differs from the usual conception. Too many of us think of

health as a condition which merely keeps us out of the physician's office. True health isn't that at all. Good optimum health is a condition of the human body in which there is a joy of living, a buoyance, a robustness, a *health plus*—I hope you get the idea. When people are physically fit, they are alert. They have endurance and *do not* tire easily, and what is usually not emphasized, they do not worry. They meet the social problems of life with common sense and make the necessary social adjustments. Most of the strange reactions in our social evolution, and unsound ideas, spring from brains that are improperly nourished. I am sure that you have never seen a well-nourished animal or child that was not reasonable and free from worry. Our worries and nervousness do great damage to our bodies, but they begin in a nervous system that is a victim of some "hidden hunger." So, if we are going to have children who can be properly educated, we are going to lengthen the lives of the American people at the other end of the span; if we are going to give them a capacity to do the tremendous amount of work which must be done in the next few years without rebelling, and if we are going to give them the fortitude and courage that is going to be necessary in each of us for the job of rearranging this world so that an enlightened and happy democracy can survive, it is going to take the very best nutritional state in the bodies of all of us.

A good national nutrition program begins with the individual. Each person must know how to select his own diet. The correct use of foods must become the popular thing to do.

Good nutrition depends upon many things. We must get good foodstuffs, rich in all the necessary elements, we must take good care of it so as not to lose those elements in storage, in preserving and in shipping. We must so prepare the food for the table that none of these essentials is lost. We must then eat of such a variety of these wholesome dishes that we get proportionately the right amount of each of the essentials. We must have a good digestion and be able to assimilate what we eat or all of our efforts have been in vain. Furthermore, foodstuffs cannot be properly used unless we have a moderate although adequate amount of physical exercise to maintain bodily tone. For these reasons the little-concentrated-tablet idea of nutrition must go. We need the natural foods.

Our tissues are made up of a series of building stones in various combinations, so we have to get a wide variety of protein in order to build our own protein (tissues). Of course, meat represents a source pretty much like our own tissues and of this we must get an adequate supply. Our interest in

tissue building was very much aroused in the first World War when the reduction in food supplies in certain countries was accompanied by cases of swelling, first among the poor in occupied or desolate areas, in prison camps, and later in the general population. The disease, it was later discovered, had been recognized for centuries under such terms as "hunger swelling" and "prison dropsy." It has occurred in epidemic form in many of the recorded wars of history, both among the troops and in the civil population. A similar dropsy occurring in malnourished infants and in those fed principally upon starches and sugars has long been familiar to our baby specialists. In 1917 it reappeared and attracted much attention in Austria where large numbers of the civil population were stricken. At first it was thought to be some one of the infections, and reports came out that large numbers were dying from relapsing fever, typhus and dysentery. The great interest which it aroused at that time led to numerous studies, with the eventual conclusion that the disease was due primarily to lack of adequate protein. One can speculate as to how much of this is prevalent in continental Europe at the present time. There is little danger of its appearing in this country except among a few food faddists. This is one of the reasons that Britain is asking us for the protein foods instead of the grain we are so anxious to raise for them. We have an interest also in the fact that when this condition interferes with the growth of an infant or child nothing much can be done to restore the damage which it has wrought. If this war lasts as long as some of us believe it will, then protein deficiencies will become a point of major importance in certain countries because of its permanent damage to the children of that country.

Let us stop for a moment to discuss the basic foods and see why so many people have vitamin deficiencies while still consuming in a large part the proper types of foodstuffs. There are four very important factors here. They are: Over-refining of foodstuffs, bad food habits, price rationing, and *foods grown on depleted soils*. The increase in the consumption of sugar and starches is the major bad habit of the American people. Our white flour and sugar give us only energy-producing substances and do not contain, as do whole grains of cereals, the fruits and vegetables, the vitamins which are necessary to burn up and utilize sugar and starches in the human body.

Let us assume that an individual requires 2,500 calories to furnish the energy to make his body go. He is supposed to get this from a balanced ration of tissue-building substances (proteins), starches and fats. Let us suppose that he gets around a thousand

of these calories from these devitalized sugars and starches. There are, therefore, only 1,500 calories left with which to bring in the vitamins and minerals necessary to burn up all the foodstuffs he has eaten for the day. It is not possible for him to secure the required amount of these vital substances from these remaining foods, even though they should happen to contain a large amount of vitamins. In order to correct this deficiency it is necessary to insist upon the use of whole-grain flours and natural fruits and vegetables in the place of sugar. It may be necessary for the doctor to reinforce the nutritional program of such a person by adding drug store vitamins and minerals to his diet until he can get him straightened out. But in order to correct this deficiency permanently there must be a decided reduction in these refined products. The sugar intake must be lower; in fact, there is no need for sugar at all. It's too bad for our Nation's health that sugar isn't rationed even more severely than was originally contemplated. We could very well give all our sugar to make explosives. We should get what we need in the way of carbohydrates from natural sources by eating vegetables, fruits, and whole-grain cereals.

White bread is not the staff of life. It's not desirable that man live on meat alone or on any other food alone. We must have a balanced ration. Certain it is, however, that we should have one good helping of meat each day and that each of us should get some internal or glandular organs rather frequently. I would like to say once a week, if there were hearts and livers and sweetbreads and brains enough to go around. Then, once a week seafood and fish from the ocean is to be substituted for the meat. We often overlook the important fact that seawater contains the minerals which are so necessary for human nutrition, and that the animals of the sea use these in building up their bodies. This is the reason that the early population gathered along the seacoast where fish, mollusk, and seaweeds were easily obtained.

Primitive man ate all of his grains, and the nearest thing to sugar in his life came when he had the good fortune to rob a bee's nest; but everyone, it would seem, is trying to force sugar on us—cakes, pies, candy, sodas, delicacies, and carbonated beverages. All of our alcoholic drinks come in this category too. We consume around 89 pounds of the 130 pounds of sugar which is produced for us. The rest goes into industry. Quite a good deal of it comes back in beer and fortified wines. This 89 pounds per year of sugar is still more than one-fourth of our daily caloric needs. Nutritionists tell us that we shouldn't get more than one-tenth of our

calories in all our sweets together. Our grandfathers didn't eat quite 14 pounds of sugar per year and it's just this that deceives the conservative who says, "My grandfather didn't know about vitamins and minerals, and he lived to be 100." Because of milling processes when your grandfather ate a slice of bread he got a right good helping of vitamin B but it's almost all missing from yours.

Fats play an important part in human nutrition and I have the personal feeling that we should use them in their natural state. The unsaturated fatty acids, especially oleic, are necessary. This has been shown to be doubly true for my patients with allergic skin troubles. Fats were difficult for primitive people to get. For the most part they had to go to nuts and seeds because most of the game that they were able to catch was not too well supplied with fat, and they had no good way of extracting it or of keeping it. The American Indian used to crack and boil up hickory nuts, strain off the sweet oil and use it for shortening. Now fats await us on every hand. Butter, lard, more than 50 kinds of cottonseed preparations, coconut oil, and many, many others. It is very easy to abuse these highly concentrated foods. For instance, most of us will eat three tablespoonfuls of butter, six of cream, two of salad dressing every day and consider it a modest allowance of fats, indeed. Translate this into potential body fat and it's 73 pounds in a year.

Fats are not only a good source of nutrition, but are effective as supports and protection for several of our internal organs. Nutritionists agree that about one-third of our calories, or units of food energy, should be provided by the right kind of fats. The best types are food products such as butter and lard.

It is not necessary to eat unduly large quantities of fat to get a third of your calories. Fats are highly concentrated fuels for body use, supplying more than twice as many calories per ounce as carbohydrate foods (starch), or protein foods (meat and cheese).

Fats like butter, lard, and meat fat exert a beneficial effect on digestion by slowing up the process. Hence, they are filling foods which stay by the body, giving it a feeling of satisfaction and postponing the pangs of hunger. This is one of the many reasons why enriched bread and butter is a splendid dietary combination.

Next to butter, probably our most popular food fat is lard, although there is a wide use of excellent vegetable shortenings and oils. Like butter, lard is about 98 percent digestible.

Another advantage of such fats in the diet is their sparing action on the body's needs for certain

vitamins, such as thiamine, or vitamin B₁. If fat is lacking in the daily fare, more of this vitamin is needed to help utilize energy foods.

Other vitamins, particularly vitamins A, D, and K are associated with and dissolved in fats, which likewise contain a substance known as linoleic acid, as necessary to life as any vitamin. For all these reasons, fats are valuable parts of our daily diet.

We are not eating too much in the sense of bulk and need not eat less. We must merely stop eating concentrated foods because we get thereby too many calories. The fastest way to grow old is to overeat, but the weighing of food and the counting of calories is a hopeless requirement. You may set it down as a practical rule that if you are maintaining your weight you have struck a balance between your intake and your requirements.

Popular ways of dying after 40 are twice as frequent among those who are overweight as among those who are of normal weight. To get back on a diet of vegetables and fruits and good meat will make it unnecessary to fight with the calories because they will automatically balance themselves. We are not asking you to leave the table hungry, for the fundamental of a good meal is the contentment of a satisfied appetite. We are asking you to broaden your food education and to discover the pleasures of large vegetable salads, green leafy vegetables, fresh fruit desserts, the double pleasure of the foods that will keep you young instead of making you grow old.

In these days when we hear so much talk about vitamins, it's equally important that we consider the role of minerals. For just as frequently there is a deficiency of a vital mineral which has been brought about by over-refining our foodstuff, introducing an overdose of some other mineral which in turn affects the availability of this one by the natural absence of the mineral itself from the soil or by its depletion through bad farm practices. Right here it is to be noted that the mineral content of roots and stems and leaves will vary a great deal more than will the seeds and nuts. So, too, will nature sacrifice the body of the mother animal or human to maintain a decent mineral level in the milk. Nature will make every effort to reproduce the individual. We are just beginning to learn the importance of our mineral metabolism and we are hoping that the new Plant, Soil, and Nutrition Laboratory of the Department of Agriculture will begin to bring us information. Tremendous strides should be made in the next few years in detecting mineral deficiencies in the soil and what these deficiencies do to plants and in turn to the animals that feed upon these plants and finally, to man who eats both the plants and the animals.

From the long-range point of view the most serious threat to our civilization is the depletion of our soil of its vital minerals. I would like to emphasize that we have destroyed the mineral resources in our soil at a constant rate.

This question of food is of the greatest importance in this war, for it is generally agreed that "Food will win the war and write the peace." Now, the sad truth is, we in the United States have never had enough food to go around. We are the healthiest people in the world, but this has been through the saving of the lives of babies and of young people. To give our people the diet we have talked about here it will require at least 1,500,000 more milch cows; 1,500,000 steers and veals; 1,500,000 pigs; for the green and yellow vegetables some 7,000,000 more acres of truck farming. The greatest potential market for American farmers is right here in America.

We must develop an adequate sense of values. In Washington they have harped for the last decade upon the fact that one-third of our people are ill fed, ill clothed, and ill housed. On the other hand, they tell about agricultural surpluses and the necessity of export trade.

Possibly this long and cruel war in which we are engaged will bring us to our senses. And when we do get our senses back we shall realize *the need for conserving the minerals in our soil*. And we shall never again be guilty of allowing anyone to have them who does not return them to the soil from which they come.

The German Government compelled its citizens to eat whole-grained breads; and these with cabbage, soybeans, a little meat, and a little animal fat to supplement synthetic fats developed from coal, have made it possible to develop an army with a magnificent physique. This has been purely imitative. The German scientists took the available knowledge on nutrition, most of which had been worked out by American students, but they have applied it on a vast scale, pretty much under compulsion.

The results have been brilliant. Those starving turnip waifs of Herbert Hoover in post-war days were made into the magnificent specimens of the Third Reich. More recently they have given synthetic vitamin C to their troops and their school children along with certain manufactured vitamin B concentrates. They have also used synthetic fat-soluble vitamins A, D, E, K. These things, together with the good use of cabbage, black bread, and soybeans, make it very unlikely that Germany will collapse this time through hidden hunger. It's interesting to note in the last military medical journals available from Germany that they are finding

out in practice what we in America have found out in experimentation; namely, that these man-made vitamins are not as good as the ones God supplies in the natural foods. Most recent report, for instance, shows that more than 25 percent of the crack pilots are suffering from bleeding and infected gums, in spite of an unlimited amount of synthetic vitamins.

The German leaders have also made a diabolical use of this information on nutrition. They have placed it in reverse in their subjugated peoples, so that these people lose their will to fight, they accept their lot, too tired to object, and any plans for invading the continent of Europe cannot expect to find millions of Germany's enemies ready to arise overnight. It will take thousands and thousands of tons of vitamin-rich foods to get them into a condition where they are capable of even wanting to take up arms.

We are now engaged in putting back some of the vital elements which we have taken out of our foodstuffs. For this we have chosen a most unfortunate term of *enrichment*, when we are only putting back a part of that which we had stolen. What are the dangers which may be incurred in the fortification of our foods with vitamins? The dangers are two: First, we know only a part of the truth as yet about the number of vitamins required for health. Second, commercial exploitation of such additions may result in our public falling into the error that artificial additions are just as good as the vitamins that occurred originally in foodstuffs, or that this exploitation may result in price increases which would remove these enriched foods from the reach of the very group who need them most. This enrichment has already cost the flour industry many millions of dollars, to which they have very patriotically submitted. Placing more expensive vitamins into the bread is almost certain to raise the price.

Since I began to take an active interest in Ohio's nutrition program, I have continually warned against a soothing statement that many have made, that "in our last war our food problem was one of production and this time we have a surplus and our problem is simply one of distribution and use." Apparent surpluses have a way of disappearing almost overnight, especially in times of war. We can afford to think twice about our boasted excess of grains and other foodstuffs. Whenever the war ends, huge amounts of wheat, fats, and meats will be required to ward off starvation, malnutrition, and epidemics which always feed upon weakened bodies of its victims.

Preservation of food, eating of apples from our own trees, raising our own gardens, is the contribu-

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THE NUTRIENT QUALITY OF THE SOIL

By W. A. ALBRECHT¹

For the students of soils, it is fast becoming a scientific fact that the soil controls the body, and for them it is almost axiomatic to subscribe to the theme of the day which says "Our health depends upon the soil."

The calcium, or lime, for example, makes up 1.6 percent of normal body weight, yet appears in the available form in the soil to but 0.2 percent, though much more in total. Phosphorus, the companion element for bone construction, is in the soil usually in available form to an extent of less than 0.01 percent, an exceedingly small part of a total that in itself is of no great amount. In the soil's capacity to provide these two nutrient elements liberally lies the solution to many problems in plant, animal, and human nutrition. As the lime and the phosphorus are stintingly withheld or generously offered, there is exerted a quiet force that determines the ecological pattern for plants, for animals and for humans. In its quiet and subtle way, the supply of these two nutrients alone may nourish life forms into dominance, or may reduce them to annihilation. They are the first two nutrients in importance in terms of common deficiencies.

Ten elements for plants, and twelve of them for animals, or three times the number of those of air and water origin, are drawn from the soil. The small quantity of each of them does not reduce the essentiality. Life is impossible with any one absent. It is thus in terms of absolute supply of body-building nutrients that the soil controls and directs the pattern of life. It limits life, at least, to those forms and numbers that can be maintained by the nutrient supply delivered by the soil.

We have moved plants from place to place according to the weather rather than according to the plants' requirements of nutrition. Further, when one agricultural plant variety no longer is highly productive, we search and supplant it with another only to boast of our success in production of tonnage of herbage. But we forget that when the first variety failed because of the declining store of soil nutrients, then the second or introduced variety that succeeds must be producing tonnage by taking relatively less from the soil. It must be making itself by taking more from

air, water and sunshine, or what is above the soil. Its service to animals must then be one of providing packing for empty paunches more than of supplying soil-contributed nutrients required for animal body construction.

Short grass highly concentrated of minerals and therefore rich in body-building capacities, has given us animals well developed in both skeleton and flesh and of unusual abilities and endurance. Because of the nutrients in the soil beneath them, grass species selected so regularly by both wild and domestic animals in the West have been good feed.

Here in the vegetation in all its varieties are the colors and the forms by which the Creator has painted the picture of the nutrient qualities of the soil. On that canvas is laid out the pattern by which the higher life forms dependent upon vegetation can guide their own distribution if they are to live healthily on the land.

The clay and humus are the seats of activity in exchanging nutrients. They are the jobbers and it is on them in root contact that the plant must depend for its nutrient store during the growing season. More humus and more clay, then, mean more nutrients and more rapid crop growth, provided these exchangers are not overstocked with hydrogen, or acidity, the only item the plant can offer in exchange if it is to do any "growing" business.

Any form of life in its restricted locality is a reflection of the nutrient quality of the soil. Conservation of life then depends on the conservation of the nutrient quality, or the fertility of the soil. Conservation encourages our optimism as we understand the first source of the natural processes on which life depends and can thereby cooperate in, rather than hinder, the creation of more life and higher life. With Hamlet, we may not only note that the times are out of joint, but with him we may also agree with our responsibility in being "born to set them aright."

¹ Chairman, Department of Soils, University of Missouri. These excerpts are from an address delivered at the Conservation Laboratory, June 27.

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tion that each of us must make if we are to have victory. Every one of us, business man, professional man, laborer, farmer or housewife, must know that business as usual stopped when we went into the war. Each of us, you and I, ought to be reducing all non-essential purchases and buying as wisely as we can to keep prices from skyrocketing.

America must wake up and learn to buy wisely of those things nearest and cheapest. An adequate diet is not so much a matter of income as it is of wise buying, proper preservation and proper cooking. It is entirely essential and patriotic to take an invoice of ourselves; to see, first, that our job is essen-

tial to the Nation at war and is not a burden of luxury upon our people; second, that we have the health which gives us the strength and the spontaneity to do our job accurately and well. Third, that we have the optimum, robust health to keep us from breeding and spreading epidemics of diseases. Fourth, that as trained persons, to whom the majority of the people must look for guidance, we practice what we preach in health and diet. Fifth, that we put every ounce of energy we have into the job before us of arousing the people of this Nation to the necessity of everyone's getting this robust buoyant health at once and all of us giving all that a healthy body can give to our country.

REBUILDING AGRICULTURAL LANDS

Under the impact of war Ohio farmers have plowed up additional sod areas for the production of grain crops.

This has in some instances probably further increased the labor requirement and cost of producing livestock products.

This increase in grain in proportion to hay and pasture will bring about further depletion in the productivity of our soils.

This reduction of forage crop acreage is compelling the harvesting for hay, or utilization as pasture forage of crop acreages that might otherwise be used for seed production, and as a result forage crop seeds are apt to be far below requirements for seeding meadows and pastures.

We recognize that with the war emergency, commercial nitrogen is being withdrawn from general agricultural use and that the only substitute is better sods with more legumes in hay and pasture, and that sufficient legume and grass seeds for this purpose are not available. Our seed situation is made worse by our efforts to supply forage crop seeds to our allies at war and the need for seeding vast areas in airports, munition plants, and other war-material plants.

While for many years the quality or quantity of our hay and pasture have not been adequate for our livestock, neither have they been adequate for the maintenance of our soil productivity. Today the situation is more acute and more dangerous.

The only solution, it appears, lies in the rebuilding of Ohio's agricultural lands. How is this to be done? First, by appropriate land use; that is, let each acre be used in that manner in which it can be conserved and contribute most to our joint welfare. Let forest land be occupied by forest, permanent sod land by permanent sods and rotation crop lands by rotation crops. Second, by affecting a balance on our rotation crop land between our soil-building and soil-depleting crops; and third, by improvement of hay and pasture lands through better soil treatment, better seedings and better management.—D. R. Dodd, professor of agronomy, Ohio State University, and associate agronomist, Ohio Agricultural Experiment Station, at the Conservation Laboratory nutrition conference, June 1942.

A REPORT ON A FRIENDLY MEETING IN MISSOURI

BY RUSSELL LORD¹

Societies, like human beings, tend to stiffen as they age. Informal parley takes on the more pretentious tone of a "conference." Meetings become "conventions" and conventional.

Perhaps it is only because we, as a society, are still so young—only 3 years old last March; nevertheless, it is pleasant to report that Friends of the Land had fewer set papers read at them during their third annual meeting at St. Louis than were read, even, at their organization meeting in Washington in 1940.

Dr. Rex Tugwell and Dr. J. Russell Smith, were as I recall it, the only two who read papers at our first meeting and both of these were 3-minute papers, little masterpieces. At our second annual meeting, held in and out from Columbus, Ohio, in July 1941, Stuart Chase read a paper so well you hardly knew he was reading it and one eminent personage, unaware of the unwritten law of our order, pulled from his pocket a bale of manuscript and started to mumble and peer over it in the conventional way. But the sigh of pain which reached him in greater and greater volume from a polite but judicious audience as he proceeded led this learned fellow soon to prove that he was not only learned but smart. He discarded his ghosted manuscript, lifted his head and talked like a man. So the score at Columbus came to one and a half papers for a 3-day session, quite a bit under par for the course.

The score at St. Louis, during our 3-day annual meeting, July 23, 24, and 25, was perfect. Not a single written paper was read from the rostrum or the floor. "Our schedule of talks and events," the printed program announced, "is in its very nature elastic and amendable. It is arranged around informal panels, led mainly by men and women who have lately come to take an active part in our programs," in the hope that they "will bring new blood and new brains into the discussion and lead to widened plans of action * * * Discussion leaders will make their own rules but keep them as few and as flexible as possible. The idea of the first day's sessions is simply to open the subjects, and let the talk take its own course freely on subsequent days."

Hugh H. Bennett, Chief of the Soil Conservation Service, spoke at the opening luncheon on Thursday, July 23. He had just come back from Mexico. Speaking from the bottom of his heart, he developed the theme of soil as common denominator in con-

tinental and ultimately in world relationships. The Chief, as readers of this *Soil Conservation* will know, has been doing a great deal of thinking on this subject, especially since he helped set up an S. C. S. in Venezuela. Each public address he has made since has brought the idea of international soil relationships closer to the ground, yet stretched it further. The stenotyped report of what was said at St. Louis is not yet available. But when it is transcribed and published I think what Hugh Bennett said will stand as a major contribution to realistic yet prophetic thinking in these stormy times. He set the keynote of the entire meeting.

Without removing from the same large hotel room where lunch was served we went over into discussion, panel-led, but with much or most of the talk from the floor that Thursday afternoon. Louis Bromfield led the first exchange of views: "Soil, Rain, and Man: A Discussion of Eternal Relationships in War and Peace." Another Ohioan on the panel was George Chandler, president of the Ohio Chamber of Commerce. He said that he had never known that bad farming hurt industry by way of a wounded water supply, directly, until "somebody who was up to something put me in the same car with this Chief of yours, Hugh Bennett, at Friends of the Land's summer tour of Ohio, a year ago." The third man on the panel was Donald Wright, Editor of the riverman's *Waterways Journal*, St. Louis. He told what bad farming had done to the bed of the Mississippi and to St. Louis, at one time a considerable inland port.

Toward 4 in the afternoon a standing recess, and then a change, or extension, of subject, with a new panel, led by Dr. W. A. Albrecht of the University of Missouri. The subject was "Hidden Hunger: Erosion and Malnutrition in War and Peace." You will find elsewhere in this issue some reference to Dr. Albrecht's findings, as he laid them before a soil and nutrition seminar held in June at Tar Hollow Camp, Ohio. You will find mention also of confirming evidence brought in by Dr. Jonathan Forman, a Columbus, Ohio, physician, who deals with intricate human patients, whereas Dr. Albrecht gathers evidence, mainly, from simpler living structures, plants, and cattle. Both these doctors were on our panel at St. Louis. So was Mrs. Luis J. Francke, conservation chairman of the Garden Clubs of America. This Friends of the Land movement is really spreading out.

¹ Editor, *The Land*.

Walter Rust, president of the Federal Land Bank of St. Louis, was toastmaster at the banquet that evening. He told no jokes but warmed and speeded the proceedings with brisk, intimate presentations. Gov. Clifford Townsend, Administrator of Conservation and Adjustment, United States Department of Agriculture, the principal speaker, bore down on a point which led the *St. Louis Globe-Democrat* to remark editorially next day: "One of America's casualties in the last World War was the land itself * * * The temptation to repeat our mistakes has arisen in this war. But American farmers need not ruin their land to meet the production quotas. On the contrary increased production and soil conservation go hand in hand. The methods used in soil building also increase the yield per acre. It is America's task to feed the world, both while the war lasts and in the period of readjustment after the war. To do this job we must conserve instead of squandering our land."

Governor Townsend had just passed the better part of a week out on the ground with S. C. S. people. He paid due tribute to the fundamental nature of their calling. Louis Bromfield closed the first day's sessions with a 10-minute talk that ignored all bureaucratic separations, and was magnificent: "I am not a scientist. I am only a farmer and writer who loves this country very dearly and who does not want to see it betrayed by its own people and despoiled. Industry is only about 150 years old in this country. Agriculture is eternal. We need a new type of pioneer, not to ruin the country, to restore it. I call on all men and women of goodwill to join this movement. It is later than we think."

Attendance the first day had run around a hundred, with people there from 15 States and from Canada. Seventy took the train to Mexico, Mo., the following Friday morning; and there were 52 cars, all full of people, on the 60-mile tour of Callaway County that Friday afternoon. The university people who arranged the tour took us first to grass rejuvenation demonstrations not far from the campus at Columbia, and then to the historic erosion-measurement plats established by Dean Miller and F. L. Duley in 1917. With the measurements established, the Miller-Duley plats are now being used to test various methods of restoring subsoil to productivity. Soil regeneration, which leads into livestock regeneration and from there into human regeneration, was the theme of the trip.

Callaway County was natural cattle country that got torn up by plows to the point of widespread ruin in the first World War. We saw farms and homes that one-crop wheat and corn culture had washed out to the point where the Government was

buying in for around \$5 an acre. And across the road we saw farms which, put under a rotation of grain and Korean lespedeza around 1935, with respect for the contours, and with a reasonable application of lime and phosphate, have come up in yield from 20 to 50 bushels of corn to the acre, and increased the carrying capacity of their pastures sevenfold.

The weather favored Friends of the Land on this inland wartime journey. The day was sparkling clear, warm but breezy, not too hot. It would be a dull soul indeed who could not see the beauty and feel the wonder of those fields, almost killed in one war by neglect and ignorance, coming back into strength so rapidly, right in the middle of World War II. It is untrue that democracies are sluggish and unteachable. Give them the facts and the proof and the people will act.

Back to St. Louis in their private, air-conditioned day coach Friends of the Land traveled, visiting around. It was the best session of the meeting. Our closing day's discussions, led by Dr. Charles E. Holzer, Chester C. Davis, and Harry Slattery, resumed an international bent. "Before you can be an internationalist," one of our wisest members, E. B. White, of Maine, has lately written, "you have first to be a naturalist and feel the land under you making the whole circle." A rather large thought in time of war, but we of this world have suffered perhaps enough from little thoughts and little thinking. We propose to examine this subject further, come October, in a series of meetings at Memphis, October 11 and 12; in the T. V. A. area, October 14 and 15; and at Louisville, Ky., October 17.

In science, taxonomic studies are important. We must know the names of things because they are the building blocks of our environment. But the meat of the matter lies in the relationships which exist between these things. There is a profound ecology between a limestone pebble and the size of a farmer's silo, and science does not become education until we see it. And, not only must the teacher see it, she must know how to make her pupils see it—that's where the teaching methods come in.—Arthur R. Harper, field naturalist, conservation education, State of Ohio Department of Education.

An air view of the La Crosse, Wisconsin, Soil Conservation Experiment Station, titled "Design for Living," won first place in the scenic class of the 1942 Inland Daily Press photograph contest. It was taken by a staff photographer of the La Crosse Tribune.



BOOK REVIEWS AND ABSTRACTS

by Phoebe O'Neill Faris

MINERALS, NUTRITION POPULARLY EXPLAINED. BY ZOLTON T. WIRTSCHAFER, M. D., NEW YORK, 1942.

This is a good straight summary of the facts as they are known about this important subject. There is a growing emphasis upon the part that minerals play in human nutrition. The author shows the specific though varied function that the minerals have in human economy. Not only are the major elements discussed but the so-called trace elements are given adequate treatment. Good nutrition is the most needed thing in American life and it depends upon good food. The nutritious quality of foods, in turn, depends upon an adequate supply of the various minerals in the soils upon which the food is grown. So all of us who have any interest in soil conservation, the problems of nutrition, or human health need this volume in our libraries.

The author points out clearly that the vital functions of the human body depend upon the ingestion, utilization, and excretion of these various minerals. The amount of mineral in the natural foodstuffs is the prime factor in determining the amount ingested. The minerals of a diet cannot serve as an index for the adequacy of the mineral supply because such an index ignores the specific role of each individual mineral element. One mineral cannot therefore be substituted for another.

It therefore becomes of the greatest importance to the race as a whole and to each of us as an individual that the soil upon which our foodstuff is grown is not depleted of these vital elements. The great lesson of conservation which our people must learn is to return to the soil the minerals which they have borrowed.—Reviewed by Jonathan Forman, M. D.

TEAMWORK TO SAVE SOIL AND INCREASE PRODUCTION. By P. A. Waring, United States Department of Agriculture *Miscellaneous Publication No. 486*. Washington, D. C., July 1942.

A farmer writes a bulletin for the Soil Conservation Service—that is news. P. A. Waring, farmer, values his and his neighbors' soil conservation project enough to go to the trouble of telling the whole story for the benefit of many thousands of other farmers. This is not merely news; it is good news.

"Actually there were six of us," he writes, "and we all lived on farms which were drained by a small stream that has long been called Honey Hollow Creek. This creek starts up on the hill on Frank's land, crosses and drains Walter's farm and Forrest's farm and then flows through the valley where Charlie and Camilo and I live." It takes a farmer to describe a watershed.

Farm land and woods; 840 acres of eastern Pennsylvania land that had been in use for 200 years or more, rolling but not any of it steep; some gullies, and "thin spots where crops grew badly"; finally the choked creek flooding all the bottom land—exposed subsoil on Walter's farm and 18 inches of overlaid sediment on Mr. Waring's valley cornfield. There you have their little watershed as it was less than 2 years ago, similar to hundreds of other little watersheds fanning out toward big rivers all over our country.

The farmer at the bottom of the watershed—Mr. Waring—"yelled first"—and went out seeking "Government" advice. The Soil Conservation Service man told him about watersheds, that he had a watershed problem, and that the six farmers would have to work together, have some maps drawn, make some plans, if they wanted to solve it. Mr. Waring looked beyond his own farm boundaries; he began to think of the whole six farms as a unit. He lost no time in gathering in his neighbors, like sheep in the fold, for a meeting with the local Soil Conservation Service representative who had come to help them "think the problem through." It happened to be a day of heavy rain, "when Honey Hollow Creek was running high and muddy under the bridge."

What will it cost? Will it be too difficult? Will we lose crops while the plan is being put into effect? Will we have to have expensive new plowing and harvesting equipment? Does it take longer to plant in strips? Above all, what can we expect in the way of yields while we are establishing soil conservation farming on our watershed? These were but a few of the questions the six farmers wanted answered. They were told that the Government would help survey the watershed, draw up the plans and maps, and put in base lines for field boundary changes. They made a visit to a neighboring county where soil conservation had been going strong for about three years; they saw contour strip planting, sodways, broad terraces, and farmers using the same equipment they had always used. They saw that these farmers were making money and that they had their erosion problems in hand. When, back at home, they finally saw the map of their farms with the conservation plan for the whole watershed, then they realized that they must work out the problem together, all because of Honey Hollow Creek.

They got started, late in September. They put in some broad-base terraces, in a field that "curved and hogbacked at the end of a long slope." They sowed winter wheat, the best they could do at that season. Skeptical neighbors laughed when little washes showed on inadequately protected ground between the terraces, but when it rained the water soaked into the soil—did not trickle creekward, roll riverward, plunge seaward, taking the soil with it.

Spring came, the eagerly awaited time when contour plowing and planting could be started, with the watershed map and conservation plans as guides. At the end of June they climbed the hill for a look—"down the hillside and across Honey Hollow * * * curved strips of corn and oats all over our farms." It was real, no longer theoretical, a mere map on paper!

Summer progressed. At the top of the watershed, Frank harvested wheat and pulled out an old hedgerow—then came the "only other group of terraces in our watershed * * * in long curves across the whole area." In strip-planting, they "jumped" the hayfield, to save the hay for the present. "Some folks had told us you had to rip out and lose good crops when you changed from square to contour farming, but that does not seem to be true. At least, we have not lost any crops yet." Thus Mr. Waring takes care of one important query regarding establishment of a conservation farming system.

By autumn the six Honey Hollow watershed farmers had solved some of their harvesting problems, the "hard-corner-to-get-at" problem, the stripped field arrangement problem; they had made a start at working out the problem of Camilo, who rents his farm to a corn grower—corn, and then corn, and then corn again, year after year, because there are no hay-storage or livestock facilities on the place. Camilo's farm is their "bad dilemma," but they will solve it, we know, because they all want to solve it.

What about the winter? During the winter, the six farmers decided to study soils, to learn what kinds of soils they had on their watershed and how much topsoil remained to them after a century and a half—and more—of use without protective methods. They summoned their friend from the Soil Conservation Service, and before long they had a soils map of their own land—and knew the none too pleasant but extremely important facts about their topsoil.

And so the farmers of Honey Hollow Creek watershed arrived at the point of "land capability," as we term it: "What is a field capable of yielding?" in Mr. Waring's words. This part of Mr. Waring's story, involving improved rotations, a unique record system, and a visitor from the Audubon Society, is in itself a little masterpiece of farmer writing. Undoubtedly Honey Hollow Creek watershed will be sweetclover-scented next year. Undoubtedly, soil conservation methods and values are in for a strict accounting in this Bucks County, Pennsylvania, area—Soil Conservation Service people must not forget this, and our share of the responsibility.

Thirty-six fine large photographs illustrate this farmer's story of six farmers' soil conservation project. There is a full-page drawing of the watershed, showing Honey Hollow Creek, placement of the six farmsteads, roadways and even the covered bridge; and, of course the conservation plan, charting " * * * our farms * * * as a piece belonging together" occupies a prominent place so that other farmers may understand why Mr. Waring said to Walter, when he saw it, "I guess we've got something here."

Postscript: Mr. Waring not only writes a bulletin for the Soil Conservation Service; he sends us greetings and up-to-date information on the success and progress of soil conservation work in Honey Hollow watershed. His latest letter, to Glenn K. Rule, Head of the Section of Education, Division of Information, Soil Conservation Service, is quoted below:

NEW HOPE, PA., August 9, 1942.

DEAR MR. RULE:

It is Sunday morning, the first chance I have had to answer your last letter. I am just in from my mid-morning chores and a thorough inspection of the farm after a terrific rain storm which has only now stopped. I wanted to see what held and what washed away and I can report with satisfaction that, though Honey Hollow Creek is running high and wide, the crop land is all in place, and as far as one can tell there has been no washing or gullying to speak of. The big bowl-like field on my neighbor, Charlie Wendig's farm, which formerly dumped tons of water and soil on my place, is only now sending a trickle down the sod-way I keep for emergencies.

I thought you might be interested in getting a first hand report from Honey Hollow on the way things are behaving in times of flood. Coming 18 months after the bulletin was written it might tend to show the permanence of some of the things described.

* * * I am happy that the book is out and in use, and I hope you will tell me what kind of reaction it gets from farmers. If it bears some results in bringing more conservation and more permanent agriculture to American farm land I will be very happy indeed. It is only a small part of a

big effort, but I hope it will play its part well * * * The farmers on our watershed and others in this neighborhood have asked for copies of the bulletin. Moreover, we are in the midst of a district movement in Bucks County.

Greetings to you from Honey Hollow.

Sincerely,

P. A. WARING.

INTRODUCCIÓN AL ESTUDIO DE LOS SUELOS.

By Alfonso Gonzalez Gallardo. Published by the Mexican National Bank of Agricultural Credit, Mexico, D. F., 1941.

Agriculture throughout the Americas is alive to its new responsibilities. It must feed a world at war, and yet be ready to face a period of serious economic readjustment when peace is again restored. How Mexico is preparing to meet this challenge is excellently demonstrated by the recent publication of "Introducción al Estudio de los Suelos" by Alfonso Gonzalez Gallardo, Under Secretary of Agriculture for the Republic of Mexico. For the Mexicans the volume is a manual for both soil classification and efficient land use planning; other Spanish-speaking Americans will find in it an answer to the long-felt need for a Spanish text on modern soil science; but to us in the United States it is evidence that Mexico has passed another milestone in its agricultural and scientific history.

In the first part of the volume, the formation of soil, its physical and chemical properties, and the nature and circulation of water within the soil are comprehensively discussed. The section on climate that follows serves two purposes. It provides a guide for adaptation of crop production to climatic conditions and a background for the subsequent discussion of the great soil groups of the world, in which Gonzalez emphasizes the soil types of Mexico and the associated soil-forming processes such as laterization, calcification, and the formation of solonetz and soloth. In these discussions the author lays no claim to originality but, in a simple and authoritative manner, analyzes and interprets the work of the outstanding European and American soil scientists in terms of its application to Mexican conditions.

The treatise on soil science, however, is presented not as an end in itself but as a tool essential to Mexican agronomists and agronomists, particularly those working on irrigation projects. The same principle is applied in the discussion on climate. For the use of their agricultural program, the Mexicans have adopted the Thornthwaite system of climatic classification with slight modifications introduced to facilitate the correlation of climate with the distribution of soil types and crop production.

Thornthwaite's climatic types are divided into subclasses with more restricted ranges of temperature and rainfall, and the seasonal rainfall factor is readjusted to correspond with tropical and subtropical growing seasons. These modifications, which demonstrate the flexibility of the Thornthwaite system, were introduced by the eminent Mexican climatologist, Alfonso Contreras Arias, and their practical value is well demonstrated in his recent study entitled "El Trigo en Mexico" (Mexico, D. F., 1941). The close correspondence between the climatic and soils maps of Mexico is also worthy of note. With Contreras' research as a background, Gonzalez presents the Mexican climatic classification in complete form and in a manner simple enough to be understood and used by agricultural workers without intensive training in meteorology.

From the standpoint of the Mexican agricultural program

the concluding third of Gonzalez's work is most significant. It provides a manual of instruction for those men who are actively engaged in the work of planning the most efficient use of the land. The instructions given for preparing soils maps and surveys are chiefly an adaptation to Mexican conditions of the principles set forth in Kellogg's "Soil Survey Manual" (U. S. Department of Agriculture Miscellaneous Publication No. 274, 1937). Accompanying each soils map is a regional report, described by Gonzalez as a "mental photograph of the area as a whole," which includes physical and climatic factors, the agricultural and industrial development of the area, transportation, markets for local produce, and the social and economic conditions of the people. Together these form a background for detailed maps of land-use capabilities—the Mexican equivalents of the land-use surveys of the Soil Conservation Service.

The criterion used for the Mexican land-use survey is a modification of the system developed by R. Earl Storie (An Index for Rating the Agricultural Value of Soils, California Agricultural Experiment Station Bulletin No. 556, 1933, Revised 1937). Like Storie, Gonzalez has limited his work to irrigated lands, since they represent the greatest source of agricultural wealth in Mexico. Both authors estimate the value of land on the basis of three factors, each of which is rated on a decimal basis. The final land evaluation is the product of these factors, and consequently may be dominated by a major deficiency in any one of the three factors considered. The chief difference lies in the fact that Storie is interested primarily in soil, and Gonzalez in land. This shift of emphasis is accomplished by the inclusion of additional factors by Gonzalez and by the readjustment of the relative importance of others.

The final evaluation is expressed by numbers ranging

from 1 to 100. "First class" land has a rating of 70 or above, and is potentially capable of producing all of the major crops of the climatic region within which it is located. "Second class" land, rating between 40 and 60, can produce much the same range of crops, provided measures for maintaining or improving the quality of the soil are employed. On "third class" lands, with a rating of 20 to 39, the deficiencies are more accentuated, the range of crops is restricted, and continuous cultivation can be maintained only at considerable expense of money or labor. "Fourth class" land, rated from 10 to 19, is adapted to pastures rather than crop production. If the rating is lower than 10, land is classed a nonagricultural.

To date only a comparatively small portion of the agricultural land of Mexico has been adequately classified. The task remaining is enormous, yet the current world situation demands rapid progress and thorough work. The services of experienced agronomists must be used with greatest efficiency and new men must be trained to assist in this vital task. Gonzalez's work is designed for the use of both groups of agricultural workers. For every phase of their work, detailed instructions are given. The experienced worker is told how to use his time efficiently, and what should be his daily accomplishment. For new workers the most minute details are included. All are urged to make their reports comprehensive and complete, but concise, avoiding unnecessary repetition and display of erudition. Words should never be used where facts are better shown by graphs or tables. As a final admonition, Gonzalez adds, "If possible, make the report pleasant to read." In all of these respects, Gonzalez himself has set a high standard of writing for those who work under him in the Mexican Department of Agriculture.—Reviewed by Lois Olson.

Observations regarding animal health, particularly among grazing animals, have led to studies of crops and soils which have resulted in discoveries of deficiencies previously unrecognized. Properly planned animal experiments with crops of known history, accompanied by detailed chemical study of the crops with respect to the nutrients required by animals, should prove very useful in evaluating soils. In undertaking such experiments, however, it must be realized that animal performance is subject to as many variables as is soil fertility, and that these variables must be taken into account in planning the experiment and in interpreting the results. There are differences in the nutritive value of rations which are not measurable in terms of growth performance but which require refined physical, biochemical, and histological techniques. Two crops may vary widely in the content of a given nutrient and yet the differences may not be evident unless the crops are fed at restricted levels of intake in rations otherwise adequate in all respects. Without control of the variables involved in animal experimentation, differences in results may be incorrectly attributed to

certain soil and plant differences known to exist. For example, marked changes in growth performance may result merely from differences in palatability or from the general unsuitability of the rations for the species in question.

Animal experiments are essential for the evaluation of certain nutritive differences such as those based upon variations in the amino acid make-up of proteins and upon vitamin differences not susceptible to determination by chemical or microbiological methods. They are useful in searching for undiscovered differences in nutritive value and undiscovered nutritive needs. They also must be the final test of the differences in nutritive value which are measured by chemical or other means.

It is clear, therefore, that we have a great many complicating factors and a great many interrelationships that must be accounted for, one by one as we attempt the task of properly evaluating "the soils that support us."—Kenneth C. Beeson, chemist, United States Plant, Soil and Nutrition Laboratory, Bureau of Plant Industry, United States Department of Agriculture, Ithaca, N. Y.

For REFERENCE

Compiled by **ETTA G. ROGERS, Publications Unit**



Field offices should submit requests on Form SCS-37, in accordance with the instructions on the reverse side of the form. Others should address the office of issue.

Soil Conservation Service

Eighth Annual Report, Coon Creek Farm Account Work, La Crosse, Monroe, and Vernon Counties, 1941. ER-52. Division of Economic Research, Soil Conservation Service, La Crosse, Wis., with the cooperation of the Wisconsin Agricultural Experiment Station. May 1942. mm.

Production and Collection of Native Grass Seed for the Southern Great Plains. Preliminary Report, prepared for use by seed collectors toward a more effective use of machinery and technical knowledge in the collection of seed supplies. Regional Office, Soil Conservation Service, Amarillo, Tex. April 1942. mm.¹ (This Regional Office was discontinued as of July 1, 1942 and requests should be directed to the Regional Nursery Division, Soil Conservation Service, Fort Worth, Tex.)

The South Tomorrow. An address given before Meetings of Friends of the Land, Atlanta, Ga., June 11, 1942, by H. H. Bennett, Chief, Soil Conservation Service. mm.

Office of Information, U. S. Department of Agriculture

ACAA in Brief. ACAA-1. Agricultural Conservation and Adjustment Administration. July 1942.

Basis for Judging Subalpine Grassland Ranges of Oregon and Washington. Circular No. 655. Pacific Northwest Range and Experiment Station, Forest Service. July 1942.

Classification of Wheat Varieties Grown in the United States in 1939. Technical Bulletin No. 795. Bureau of Plant Industry. June 1942. 35¢.²

Conservation is a War Weapon. ACAA-2. Agricultural Conservation and Adjustment Administration. 1942.

Controlling Corn and Hog Supplies and Prices. Technical Bulletin No. 826. Bureau of Agricultural Economics. June 1942. 15¢.²

Cotton or Boll Weevils. Miscellaneous Publication No. 484. Bureau of Entomology and Plant Quarantine. 1942. 10¢.

Distribution of the Varieties and Classes of Wheat in the United States in 1939. Circular No. 634. Bureau of Plant Industry. August 1942. 15¢.²

Economic Management of Western White Pine Forests. Technical Bulletin No. 830. Forest Service, August 1942. 20¢.²

Effect of Mulches and Surface Conditions on the Water Relations and Erosion of Muskingum Soils. Technical Bulletin No. 825. Soil Conservation Service with the cooperation of the Ohio Agricultural Experiment Station. July 1942. 5¢.²

Equipment and Methods for Harvesting Farm Woodland Products. Farmers' Bulletin No. 1907. Forest Service. July 1942.

Soluble Material of Soils in Relation to Their Classification and General Fertility. Technical Bulletin No. 813. Bureau of Plant Industry. June 1942. 15¢.²

Sugar-Beet Culture in the Intermountain Area with Curly Top Resistant Varieties. Farmers' Bulletin No. 1903. Bureau of Plant Industry. May 1942.

Using Crop Residues for Soil Defense. Miscellaneous Publication No. 494. Soil Conservation Service with the cooperation of the Nebraska Agricultural Experiment Station. August 1942.

Varieties of Spring Wheat for the North Central States. Farmers' Bulletin No. 1902. Bureau of Plant Industry. April 1942.

Winter Legumes for Green Manure in the Cotton Belt. Farmers' Bulletin No. 1663. Bureau of Plant Industry and the Bureau of Agricultural Economics. Revised May 1942.

Wood Fuel in Wartime. Farmers' Bulletin No. 1912. Lake States Forest Experiment Station, Forest Service. July 1942.

State Bulletins

Annual Crops for Hay and Pasture. Extension Bulletin No. 238. Extension Division, Michigan State College, East Lansing, Mich. April 1942.

Are You Growing Gullies or Trees? Extension Circular No. 255. North Carolina Agricultural Extension Service, Raleigh, N. C., with the cooperation of the Tennessee Valley Authority. June 1942.

Better Feed from Good Hay. Special Circular A-23. Extension Service, North Dakota Agricultural College, Fargo, N. Dak. June 1942.

Effect of Drought and Rainfall on Movement of Soil Nitrogen in Cecil Soils. Circular No. 137. Georgia Experiment Station, Experiment, Ga. July 1942.

Establishing Carpet Grass Under Range Conditions by Controlled Burning and Seeding. Press Bulletin No. 571. Agricultural Experiment Station, University of Florida, Gainesville, Fla. June 1942.

Farm Management Aspects of the War. Circular Bulletin No. 182. Agricultural Experiment Station, Michigan State College, East Lansing, Mich. April 1942.

Fertility Needs of Dairy Farm Crops in the Connecticut Valley. Circular No. 61. Agricultural Experiment Station, University of New Hampshire, Durham, N. H. April 1942.

Fertilizer Needs of Alfalfa on New Hampshire Soils. Circular No. 58. Agricultural Experiment Station, University of New Hampshire, Durham, N. H. April 1942.

Forests and Land Use. Bulletin No. 229. Division of Land Economic Inventory and Land Use, Wisconsin Department of Agriculture, Madison, Wis. April 1942.

Hay Crop Silage. Bulletin No. 360. Agricultural Experiment Station, University of Minnesota, University Farm, St. Paul, Minn. May 1942.

Increasing the Efficiency of Beef Production in North Dakota. Circular No. 172. Extension Service, North Dakota Agricultural College, Fargo, N. Dak. June 1942.

Mobilize New Hampshire Forage Resources for 1942 and 1943. Ext. Circ. No. 242. Extension Service, University of New Hampshire, Durham, N. H. May 1942.

Percolation and Water Requirement Studies with Alfalfa by Means of Lysimeters in Oregon. Station Bulletin No. 404. Agricultural Experiment Station, Oregon State College, Corvallis, Oreg., with the cooperation of the U. S. Department of Agriculture. February 1942.

Proso, Corn and Barley as Feeds for Hogs on Alfalfa Pasture. Bulletin No. 318. Agricultural Experiment Station, North Dakota Agricultural College, Fargo, N. Dak. June 1942.

Silage: High Quality Feed for any Season at Low Cost. Special Circular No. A-25. Extension Service, North Dakota Agricultural College, Fargo, N. Dak. July 1942.

Small Grain Production in the Lowland Region of Southeast Missouri. Bulletin No. 440. Agricultural Experiment Station, University of Missouri, Columbia, Mo. January 1942.

Soil Organic Matter: Its Nature and Importance. Circular No. 422. New Jersey Agricultural Experiment Station, Rutgers University, New Brunswick, N. J. April 1942.

Turkey-Off Sorghums and Proso: A Progress Report. Circular No. 38. Agricultural Experiment Station, South Dakota State College, Brookings, S. Dak. March 1942.

Vetch Varieties for Soil Improvement and Seed Production in Alabama. Bulletin No. 253. Agricultural Experiment Station, Alabama Polytechnic Institute, Auburn, Ala. March 1942.

War-Time Fungicides and Insecticides. Press Bulletin No. 573. Agricultural Experiment Station, University of Florida, Gainesville, Fla. July 1942.

Wheat Production in California. Bulletin No. 659. Agricultural Experiment Station, University of California, Berkeley, Calif. December 1941.

¹ Prepared solely for official use by the Soil Conservation Service.

² From Superintendent of Documents, U. S. Government Printing Office, Washington, D. C.

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Left to Right: Claude R. Wickard, Secretary of Agriculture, United States; Pamanes Escobedo, House of Representatives, Mexico; President Avila Camacho, at the microphone; Marte R. Gomez, Secretary of Agriculture, Mexico.

**PRESIDENT CAMACHO OPENS THE
INTER-AMERICAN CONFERENCE ON AGRICULTURE
MEXICO CITY
JULY 6**